

Colágeno marino como insumo innovador para la industria cosmética y farmacéutica: revisión sistemática (2015-2025)

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RESUMEN

El propósito de esta revisión bibliográfica es establecer que el colágeno marino ofrece una gran ventaja en cuanto a sus propiedades, y que tiene un impacto sostenible en comparación al colágeno terrestre, comparando su eficacia y seguridad como un biomaterial innovador, dada su alta biocompatibilidad, bajo peso molecular, elevada biodisponibilidad y propiedades biofuncionales, este tipo de colágeno, que se obtiene a partir de subproductos de especies marinas ya sea de la piel, escamas o cartílagos de peces, representa una alternativa eficaz frente a otro tipo de fuentes tradicionales, y que permite aprovechar esos residuos orgánicos dándoles un valor agregado y así mismo promoviendo la economía circular. Algunos estudios científicos recientes han demostrado su superioridad frente a otras fuentes de colágeno, tanto

por su funcionalidad como por su seguridad, al no generar reacciones citotóxicas significativas. Se espera como resultado confirmar que el colágeno marino no solo ofrece beneficios funcionales y terapéuticos significativos, sino que también tiene un impacto ambiental positivo, fortaleciendo su viabilidad comercial en la industria. Básicamente se centra en recolectar y sistematizar información confiable que respalde las propiedades y las aplicaciones del colágeno marino como potencial en la industria cosmética y farmacéutica por medio de estudios bibliográficos de la literatura científica.

Palabras claves: Biomaterial, biocompatibilidad, formulaciones cosméticas, reacciones citotóxicas.

ABSTRACT

The purpose of this literature review is to establish that marine collagen offers a great advantage in terms of its properties, and that it has a sustainable impact compared to terrestrial collagen, comparing its efficacy and safety as an innovative biomaterial, given its high biocompatibility, low molecular weight, high bioavailability and biofunctional properties, this type of collagen, which is obtained from by-products of marine species, whether from the skin, scales or cartilage of fish, represents an effective alternative to other types of traditional sources, and that allows these organic waste to be used, giving them added value and thus promoting the circular economy. Some recent scientific studies have demonstrated its superiority over other sources of collagen, both due to its functionality and its safety, by not generating significant cytotoxic reactions. The result is expected to confirm that marine collagen not only offers significant functional and therapeutic benefits, but also has a positive environmental impact, strengthening its commercial viability in the industry. It basically focuses on collecting and systematizing reliable information that supports the properties and applications of marine collagen as a potential in the cosmetics and pharmaceutical industries through bibliographic studies of the scientific literature.

KeyWords: Biomaterial, biocompatibility, cosmetic formulations, cytotoxic reactions.

REFERENCIAS

- Alcaide-Ruggiero, L., Molina-Hernández, V., Granados, M. M., & Domínguez, J. M. (2021). Main and minor types of collagens in the articular cartilage: The role of collagens in repair tissue evaluation in chondral defects. *International Journal of Molecular Sciences*, 22(24). <https://doi.org/10.3390/ijms222413329>
- Espinales, C., Romero-Peña, M., Calderón, G., Vergara, K., Cáceres, P. J., & Castillo, P. (2023). Collagen, protein hydrolysates and chitin from by-products of fish and shellfish: An overview. *Heliyon*, 9(4), e14937. <https://doi.org/10.1016/j.heliyon.2023.e14937>
- Geahchan, S., Baharlouei, P., & Rahman, A. (2022). Marine Collagen: A Promising Biomaterial for Wound Healing, Skin Anti-Aging, and Bone Regeneration. *Marine Drugs*, 20(1), 61. <https://doi.org/10.3390/md20010061>
- Laasri, I., Bakkali, M., Mejias, L., & Laglaoui, A. (2023). Marine collagen: Unveiling the blue resource-extraction techniques and multifaceted applications. *International Journal of Biological Macromolecules*, 253, 127253. <https://doi.org/10.1016/j.ijbiomac.2023.127253>
- Patel, G., Chokshi, H., & Prajapati, B. (2024). Impact of marine collagen on nanocosmetics: A comprehensive review. *Nano-Structures & Nano-Objects*, 40, 101394. <https://doi.org/10.1016/j.nanoso.2024.101394>
- Prajaputra, V., Isnaini, N., Maryam, S., Ernawati, E., Deliana, F., Haridhi, H. A., Fadli, N., Karina, S., Agustina, S., Nurfadillah, N., Arisa, I. I., Desiyana, L. S., & Bakri, T. K. (2024). Exploring marine collagen: Sustainable sourcing, extraction methods, and cosmetic applications. *South African Journal of Chemical Engineering*, 47, 197-211. <https://doi.org/10.1016/j.sajce.2023.11.006>
- Sathyaraj, W. V., Pravin, Y. R., Prabakaran, L., Gokulnath, A., Bhoopathy, J., & Rajendran, S. (2024). Therapeutic potency of marine collagen/pectin scaffolds - Fabrication, characterization and evaluation. *European Journal of Pharmacology*, 984, 177066. <https://doi.org/10.1016/j.ejphar.2024.177066>
- Siahaan, E. A., Agusman, Pangestuti, R., Shin, K.-H., & Kim, S.-K. (2022). Potential Cosmetic Active Ingredients Derived from Marine By-Products. *Marine Drugs*, 20(12), 734. <https://doi.org/10.3390/md20120734>
- Tong, M., Zhang, X., Zhong, J., Xie, Q., & Xiong, S. (2025). Sources and types of collagens used in the cosmetic industry. *Journal of Dermatologic Science and Cosmetic Technology*, 100068. <https://doi.org/10.1016/j.jdsct.2025.100068>

- Costa, J. P., Custódio, L., & Reis, C. P. (2023). Exploring the Potential of Using Marine-Derived Ingredients: From the Extraction to Cutting-Edge Cosmetics. In *Marine Drugs* (Vol. 21, Issue 12). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/md21120620>
- Harinisri Ram, K., & Thamarai Selvi, B. (2024). Inventive Applications of Marine Resources in Cosmetic Production: A Review. In M. Rafatullah, M. R. Siddiqui, M. A. Khan, & R. T. Kapoor (Eds.), *Multidisciplinary Applications of Marine Resources: A Step towards Green and Sustainable Future* (pp. 407–441). Springer Nature Singapore. https://doi.org/10.1007/978-981-97-5057-3_19
- Rahman, A., Rehmani, R., Pirvu, D. G., Huang, S. M., Puri, S., & Arcos, M. (2024). Unlocking the Therapeutic Potential of Marine Collagen: A Scientific Exploration for Delaying Skin Aging. In *Marine Drugs* (Vol. 22, Issue 4). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/md22040159>
- Resende, D. I. S. P., Ferreira, M., Magalhães, C., Sousa Lobo, J. M., Sousa, E., & Almeida, I. F. (2021). Trends in the use of marine ingredients in anti-aging cosmetics. *Algal Research*, 55, 102273. <https://doi.org/10.1016/J.ALGAL.2021.102273>
- Mannur Ismail Shaik, Rahman, A., Anis Syafiqah Yusri, Mohammad Rashedi Ismail-Fitry, Nune, & Norizah Mhd Sarbon. (2024). A review on the processing technique, physicochemical, and bioactive properties of marine collagen. *Journal of Food Science*. <https://doi.org/10.1111/1750-3841.17273>